

## **REMARKS**

The specification was objected to under MPEP 608.01(o) for failing to identify the “z-drive housing or the radial drive housing” elements. Claims 1, 3-8, 11, 13 and 24-26 were pending in the Application prior to the outstanding Office Action. In the Office Action, claims 1, 3-8, 11, 13 and 24-26 were rejected under 35 U.S.C. §112, second paragraph. Claims 1, 3-8, 11, 13, and 25-26 were rejected under 35 U.S.C. §103(a).

### **I. RESPONSE TO OBJECTION UNDER MPEP 608.01(o)**

In paragraph 1 of the Office Action, the Examiner objected to the specification for “failing to provide proper antecedent basis for the claimed subject matter.” Applicants have amended the pending claims in this application to provide a proper antecedent basis for the claimed subject matter. Therefore, Applicants respectfully request the Examiner to remove this objection.

### **II. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §112, SECOND PARAGRAPH**

In paragraph 3 of the Office Action mailed December 1, 2004, the Examiner rejected claims 1, 3-8, 11, 13, and 24-26 under 35 U.S.C. §112, second paragraph.

#### **A. Independent Claim 1**

Applicants have amended claim 1 to clarify that only a “mechanism” of the “z-axis drive assembly” moves vertically between a first position and a second position. Applicants suggest that amended claim 1 distinctly points out the subject matter which the Applicants regard as the invention. Therefore, Applicants request the Examiner to remove this rejection.

#### **B. Dependent Claims 3-8, and 24**

Dependent claims 3-8, depend directly or indirectly from independent claim 1. These dependent claims include all of the limitations of the independent claim from which they depend. Applicants respectfully assert that dependent claims 3-8 are allowable for at least the reasons set forth above concerning independent claim 1. Applicants have canceled claim 24.

#### **C. Independent Claim 11**

For at least the same reasons as discussed above with regard to claim 1, Applicants request the Examiner to remove this rejection.

#### **D. Dependent Claim 13, 25 and 26**



Dependent claims 13, 25 and 26 depend directly or indirectly from independent claim 11. These dependent claims include all of the limitations of the independent claim from which they depend. Applicants respectfully assert that dependent claims 13, 25 and 26 are allowable for at least the reasons set forth above concerning independent claim 11.

### III. RESPONSE TO REJECTIONS UNDER 35 U.S.C. §103(a)

In paragraphs 5-8 of the Office Action mailed December 1, 2004, the Examiner rejected claims 1, 3-8, 11, 13 and 24- 26 under 35 U.S.C. §103(a) as being unpatentable over several combinations of the following patents:

- U.S. Patent No. 5,928,390 issued to Yaegashi et al. ("*Yaegashi*");
- U.S. Patent No. 6,099,643 issued to Ohtani et al. ("*Ohtani*");
- U.S. Patent No. 5,794,487 issued to Solomon et al. ("*Solomon*"); and
- U.S. Patent No. 4,770,590 issued to Hugues et al. ("*Hugues*"); and
- U.S. Patent No. 5,626,456 issued to Nishi et al. ("*Nishi*").

Fig. 7 of *Yaegashi* illustrates a wafer transfer mechanism 21. The wafer transfer mechanism 21 has "a columnar support body 70 comprising a pair of mutually facing vertical wall portion 71 and 72 coupled to each other at their upper and lower ends." *Yaegashi*, 9:49-52. The lower end of the body 70 "is coupled to a rotary shaft of a rotational drive motor 74." *Yaegashi*, 9:54-56. A rotational shaft 70a, extending from the top of the body 70, is pivotally secured to the processing station frame. The support body 70 pivots about a theta-axis (see Fig. 7), which passes through the longitudinal central axis of both the rotational shaft 70a and the rotary shaft. The mechanism also includes a wafer transfer member 73 that travels vertically between the two body walls 71 and 72. *Yaegashi*, 9: 52-54. The theta-axis passes substantially through the geometric center of the wafer transfer member 73.

*Ohtani* describes a substrate transport robot TC. Robot TC includes "an X-direction driving mechanism 20, a Z-direction (vertical) driving mechanism 30, a rotation mechanism 40 and an arm sliding mechanism 50." *Ohtani*, 8:7-10; Fig. 10. The Z-direction driving mechanism 30 "utilize[s] stretch driving of a pantagraph structure." *Ohtani*, 8: 18-19. The rotation mechanism 40 and the arm sliding mechanism 50 "are adapted to rotate arms of the substrate transport robots TC and TH in horizontal planes and advancing/retreating the arms respectively."



*Ohtani*, 8: 19-21. As shown in Fig. 10 of *Ohtani*, the Z-direction driving mechanism 50 lifts and lowers both the rotating mechanism 40 and the arm sliding mechanism 50.

*Solomon* describes a drive system for a conventional dual-link robotic arm 24. The robotic arm 24 has “a lower arm link 26, an upper arm link 28, and a hand or end effector 30.” *Solomon*, 3: 9-11. In the Fig. 3 embodiment, each arm link 26, 28 includes “a high-density metallic or ceramic filter 170,172 ... mounted in the bottom wall 26’ of the arm link or arm ‘hub’.” *Solomon*, 6: 45-47. The filters “provide a dense barrier against entry or exit of particles from the arm links.” *Solomon*, 6: 47-48.

*Hugues* describes a wafer transfer module mechanism 29 that includes a paddle 33 to pick up and carry a wafer 35. The mechanism itself 29 is stationary. However, the paddle 33 “is movable in a vertical (Z) direction and in a radial (R) direction and in a rotational (theta) direction.” *Hugues*, 4: 49-51.

**Yaegashi in view of Ohtani**

In the Office Action, the examiner rejected claims 1, 3-6, 11 and 25 under 36 U.S.C § 103(a) as being unpatentable over *Yaegashi* in view of *Ohtani*.

**A. Independent Claim 1 Patently Distinguishes over *Yaegashi* in view of *Ohtani***

Claim 1, among other things, recites:

“a support column having a first end a second end, and a longitudinal central axis;

a rotational drive housing mounted to said carriage, said rotational drive housing substantially enclosing a rotational drive being adapted to affix to said first end of said support column for rotating said support column about said longitudinal central axis, said longitudinal central axis defining a substantially vertical theta axis that is substantially perpendicular to said x-axis;

a slide body mounted to said mechanism, said slide body substantially enclosing a radial drive assembly being adapted to move an end effector between a first position and second position along a third linear path, said third linear path defining a radial axis; and



wherein said theta axis is offset from a z-axis traveling substantially through the geometric center of said slide body.”

The wafer transfer mechanism disclosed in *Yaegashi* does not teach or suggest that the wafer transfer mechanism 73 rotates about a theta axis that is “offset from a z-axis traveling substantially through the geometric center of said slide body.” In contrast, Figs. 7-8 of *Yaegashi* illustrate that the wafer transfer mechanism 73 rotates about a theta axis that passes through the geometric center of the wafer transfer member 73. In other words, the theta axis is concentric with the z-axis. As noted in the Specification, the “theta axis does not travel through the center of the slide body.” p. 40, lines 6-7. This feature provides several advantages over the wafer transfer mechanism 21 disclosed in *Yaegashi*. For example, the offset increases the reach and turning radius of the wafer engine recited in claim 1 over conventional wafer handling robots. Fig. 27B of the application “illustrates the reach and swing advantages of the off-set slide body rotation about the theta axis.” Specification, p. 56, lines 4-16. These advantages are achieved, in part, because the wafer engine only requires a single “vertical drive column.” In contrast, the robot in *Yaegashi* requires two vertical drive columns 71 and 72. Therefore, Applicants respectfully assert that the wafer engine as recited in claim 1 is not obvious over *Yaegashi*.

Moreover, *Ohtani* does not teach or suggest providing the elements missing in *Yaegashi*. The robot TC in *Ohtani* does not include a single “vertical drive column” for moving the sliding mechanism 50 along the z axis. In contrast, the robot TC in *Ohtani* raises and lowers the sliding mechanism 50 by a driving mechanism 30 at the base of the robot TC.

Further, a person skilled in the robot art would not combine the robot TC in *Ohtani* with the robot 21 in *Yaegashi*. The robot 21 in *Yaegashi* includes stationary vertical walls 71 and 72 that the wafer transfer mechanism 73 travels along. In contrast, the robot TC in *Ohtani* moves the arm sliding mechanism 50 by a Z-direction driving mechanism 30 at the base of the robot, which comprises stretch driving of a pantagraph structure. Using the driving mechanism 30 in *Ohtani* to raise and lower the robot 21 in *Yaegashi* requires lifting greater weight (e.g., entire robot 21 versus only the wafer transfer member 73) and creates more particles (e.g., driving mechanism 30 in *Ohtani* will generate many more particles than the wafer transfer mechanism 73 in *Yaegashi*). Therefore, Applicants respectfully assert that the wafer engine recited in claim 1 is not obvious over *Yaegashi* in view of *Ohtani*.



**B. Dependent Claims 3-6 Patently Distinguish over *Yaegashi* in view of *Ohtani***

Dependent claims 3-6 depend directly or indirectly from independent claim 1. These dependent claims include all of the limitations of the independent claim from which they depend. Applicants respectfully assert that dependent claims 3-6 are allowable for at least the reasons set forth above concerning independent claim 1.

**C. Independent Claim 11 Patently Distinguishes over *Yaegashi* in view of *Ohtani***

Claim 11, among other things, recites:

“a substantially L-shaped z-axis drive housing having a vertical drive column extending from a support member that is affixed to said second end of said support column, said vertical drive column substantially enclosing a z-axis drive assembly having a mechanism being adapted to move vertically between a first position and a second position along a second linear path;  
a slide body removably mounted to said mechanism, said slide body substantially enclosing a radial drive assembly having a second mechanism being adapted to move between a first position and a second position along a third linear path, said third linear path defining a radial axis;  
an end effector mounted to said second mechanism;”

For at least the same reasons discussed above with regard to claim 1, the wafer engine recited in claim 11 is not obvious over *Yaegashi* in view of *Ohtani*.

**D. Dependent Claims 25 Patently Distinguishes over *Yaegashi* in view of *Ohtani***

Dependent claim 25 depends directly or indirectly from independent claim 11. This dependent claim includes all of the limitations of the independent claim from which it depends. Applicants respectfully assert that dependent claim 25 is allowable for at least the reasons set forth above concerning independent claim 11.

***Yaegashi* in view of *Ohtani* and further in view of *Hugues***

In the Office Action, the examiner rejected claims 7 and 13 under 35 U.S.C. 103 (a) as being unpatentable over *Yaegashi* in view of *Ohtani* and further in view of *Hugues*.

**A. Dependent claim 7 Patently Distinguishes over *Yaegashi* in view of *Ohtani* and further in view of *Hugues***



Dependent claim 7 depends directly or indirectly from independent claim 1. For the same reasons discussed above, the wafer engine recited in claim 1 is not obvious over *Yaegashi* in view of *Ohtani*.

Moreover, *Hughes* does not provide the elements missing from both *Yaegashi* and *Ohtani*. The wafer transfer mechanism 29 is mounted within the processing tool. The mechanism 29 cannot translate along an x direction. Therefore, Applicants respectfully assert that the wafer engine recited in claim 1 is not obvious over *Yaegashi* and *Ohtani* in further view of *Hughes*. Since claim 7 depends from claim 1, Applicants respectfully assert that claim 7 is allowable.

**B. Dependent claim 13 Patently Distinguishes over *Yaegashi* in view of *Ohtani* and further in view of *Hughes***

Dependent claim 13 depends directly or indirectly from independent claim 11. For at least the same reasons discussed above, claim 11 is not obvious over *Yaegashi* and *Ohtani* in further view of *Hughes*. Since claim 13 depends from claim 11, Applicants respectfully assert that claim 13 is allowable.

***Yaegashi* in view of *Ohtani* and further in view of *Solomon***

In the Office Action, the examiner rejected claims 8 and 26 under 35 U.S.C. 103 (a) as being unpatentable over *Yaegashi* in view of *Ohtani* and further in view of *Solomon*

**A. Dependent claim 8 Patently Distinguishes over *Yaegashi* in view of *Ohtani* and further in view of *Solomon***

Dependent claim 8 depends directly or indirectly from independent claim 1. For at least the same reasons discussed above, claim 1 is not obvious over *Yaegashi* in view of *Ohtani*. Moreover, *Solomon* does not provide the elements missing in both *Yaegashi* and *Ohtani*. Claim 8 recites a “fan/filter unit” that vents air out of the “slide body.” The ceramic filters 170, 172 disclosed in *Solomon* are passive filters. These filters do not actively vent filtered air. In contrast “the filters provide a dense barrier against entry or exit of particles from the arm links.” *Solomon*, 6:47-48. Therefore, Applicants respectfully assert that dependent claim 8 is allowable for at least the reasons set forth above concerning independent claim 1.



**B. Dependent claim 26 Patently Distinguishes over *Yaegashi* in view of *Ohtani* and further in view of *Solomon***

For at least the same reasons discussed above regarding claim 8, the wafer engine recited in claim 26 is also allowable.

**Additional Remarks**

The references cited by the Examiner but not relied upon have been reviewed, but are not believed to render the claims unpatentable, either singly or in combination.

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application are allowable, and a Notice of Allowance is requested.

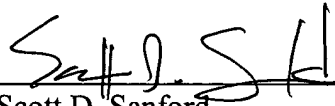
Enclosed is a PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. §1.136 for extending the time to respond up to and including today, May 27, 2005.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-0639 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: May 27, 2005

By: \_\_\_\_\_

  
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